

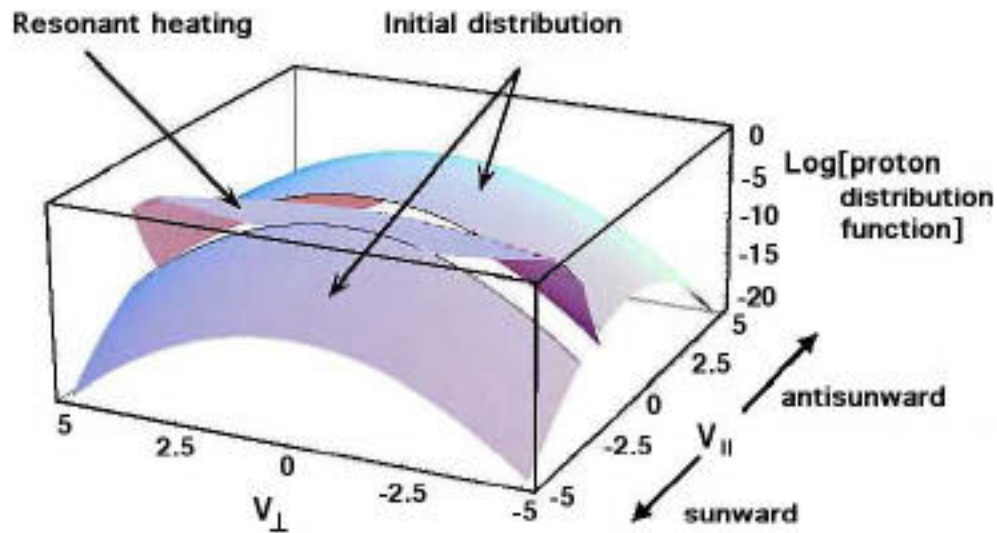
Title: *Coronal Heating Source*

Cluster: *Cross-Theme Theory and Data Analysis/SECTP*

Contributor: *J. Hollweg/U. New Hampshire*

• **Source Mechanism for High Coronal Temperatures May Have Been Found**

New research by the University of New Hampshire, SEC Theory Program group may have identified the energy source that heats the Sun's corona to temperatures above that of the solar surface. The investigators propose that intermittent small scale magnetic field reconnection events ("micro-flares") low in the corona produce beams of electrons that carry energy higher up into the corona. This sporadic electron heat flux is likely to be strong enough to make the plasma unstable, driving ion-resonant waves that heat the ions. The suggested new mechanism can explain the observations of very high ion temperatures in the corona by the Ultraviolet Coronagraph Spectrometer on SOHO. A well-known consequence of the elevated ion temperatures is the fast solar wind. Hence the conclusion could have a momentous impact on understanding the solar wind, a key player in NASA's quest to determine the Sun's effect on the Earth's environment.



Resonant proton heating at 1.5 solar radii associated with a micro-flare burst. The ions have diffused from a smaller to a larger speed transverse to the radial background magnetic field.

REFERENCE: S. A. Markovskii and J. V. Hollweg, Electron heat flux instabilities in coronal hole: implications for ion heating, *Geophys. Res. Letters*, 1029/2002GL015189, 2002.